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Date: September 19, 2000

Docket No.: 2257-162P

Assistant Commissioner for Patents
Washington, DC 20231

Sir:

This is a Request for filing a ☐ continuation ☒ divisional ☐ continuation-in-part application under 37 C.F.R. § 1.53(b) of pending prior Application No. 08/985,779 filed on December 5, 1997, the entire contents of which are hereby incorporated by reference,
by

Naoki KATO

for

RECORDING DEVICE, VIDEO OUTPUT DEVICE, VIDEO DISPLAY/RECORD SYSTEM AND SIGNAL PROCESSING METHOD FOR VIDEO DISPLAY/RECORD SYSTEM

1. ☒ Enclosed is an application consisting of specification, claims, declaration and drawings/photographs (if applicable).

2. ☒ The filing fee has been calculated as follows:

			LARGE ENTITY	SMALL ENTITY
	BASIC FEE		$690.00	$345.00
	NUMBER FILED	NUMBER EXTRA	RATE FEE	RATE FEE
TOTAL CLAIMS	2-20 =	0	x 18 = $0.00	x 9 = $0.00
INDEPENDENT CLAIMS	2-3 =	0	x 78 = $0.00	x 39 = $0.00
☐ MULTIPLE DEPENDENT CLAIMS PRESENTED			+ $260.00	+ $130.00
		TOTAL	$690.00	$0.00

3. ☒ A check in the amount of $690.00 to cover the filing fee and recording fee (if applicable) is enclosed.

4. ☐ Please charge Deposit Account No. 02-2448 in the amount of $0.00. A triplicate copy of this request is enclosed.

5. Amend the specification by inserting before the first line thereof the following:

a. ☒ --This application is a ☐ continuation ☒ divisional ☐ continuation-in-part of co-pending Application No. 08/985,779, filed on December 5, 1997, the entire contents of which are hereby incorporated by reference.--

b. ☐ --This application is a ☐ continuation ☐ divisional ☐ continuation-in-part of co-pending Application No. 08/985,779, filed on December 5, 1997. Application No. 08/985,779 is the national phase of PCT International Application No. PCT/_____/_____ filed on _____ under 35 U.S.C. § 371. The entire contents of each of the above-identified applications are hereby incorporated by reference.--

6. ☒ Enclosed is/are eight (8) sheet(s) of formal drawings and/or photographs.

7. ☐ A statement claiming small entity status was filed in prior Application No. 08/985,779 on _____. See the attached copy of the statement claiming small entity status.

8. ☒ The prior application is assigned to Mitsubishi Denki Kabushiki Kaisha.

9. ☒ A Preliminary Amendment is enclosed.

10a. ☒ Priority of Application No(s). 8-326682 filed in Japan on June 12, 1996 is/are claimed under 35 U.S.C. § 119. See attached copy of the Letter claiming priority filed in the prior application on March 26, 1998.

10b. ☐ Priority of International Appln. _____ filed on _____ under the Patent Cooperation Treaty and _____ Application No. _____ filed in _____ on _____ under 35 U.S.C. § 119 are hereby reclaimed.

11. ☒ An Information Disclosure Statement and PTO-1449 form(s) are attached hereto for the Examiner's consideration.

12. ☒ Address all future communications to:

BIRCH, STEWART, KOLASCH & BIRCH, LLP
P.O. Box 747
Falls Church, VA 22040-0747
Telephone: (703) 205-8000
or
Customer No. 2292

13. ☐ An extension of time for _____( ) month(s) until _____ has been submitted in parent Application No. 08/985,779 in order to establish co-pendency with the present application.

14. ☐ Also enclosed herewith is the following:

_____

_____

_____

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By _____
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JAC/DRA/lab
2257-162P

Attachments

(Rev. 06/07/2000)

PATENT
2257-162P

IN THE U.S. PATENT AND TRADEMARK OFFICE

Applicant:	Naoki KATO		
Appl. No.:	NEW	Group:	UNASSIGNED
Filed:	September 19, 2000	Examiner:	UNASSIGNED
For:	RECORDING DEVICE, VIDEO OUTPUT DEVICE, VIDEO DISPLAY/RECORD SYSTEM AND SIGNAL PROCESSING METHOD FOR VIDEO DISPLAY/RECORD SYSTEM		

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, DC 20231

September 19, 2000

Sir:

The following preliminary amendments and remarks are respectfully submitted in connection with the above-identified application.

AMENDMENTS

IN THE SPECIFICATION:

Page 1

Line 8, delete "the"

Line 11, delete "which are"

Line 15, change "Described below as an" to --An--

Line 16, after "to" insert --the--

Line 17, change ", specifically" to --, whereby--

Line 18, change "which is provided with functions" to --is capable--

Line 19, change "signal" to --signals--

Line 22, change "so that it can limit the mode for outputting the video signal" to --to limit the video signal output mode--

Line 23, after "to" insert --performance--; delete "(performance)"; after "thereto." insert

--More specifically, the video output equipment--

Line 24, delete "(It"; delete "outputted from the video"

Line 25, delete "output equipment"; delete ")"

Page 2

Line 2, after "DDC" insert --standard--

Line 14, after "recording" insert --an--

Line 16, change "input" to --inputting--

Line 17, delete "of"

Line 18, change "on the basis of" to --based on--

Line 24, after "least" insert --digital--; delete "by digital signal"; delete "by digital"

Line 25, delete "video signal"

Page 3

Line 2, delete "containing digital information"

Line 4, change "to" to --on--

Line 8, change "applying" to --performing--; change "to" to --on--

Line 15, change "structure above" to --above structure--

Line 20, change "signal" to --a signal which is--

Line 24, after "select" insert --a--; delete "the" (first occurrence); delete "of the video signal"

Page 4

Line 10, change "raises" to --causes--; after "that" insert --,--

Line 11, after "device" insert --,--; after "command" insert --,--; delete "for change"

Line 12, change "through" to --via--; after "32" insert ---,--; delete "so as"

Line 15, delete "subjected to reconstruction in the"

Line 16, delete "reconstructing device 6"

Line 19, change "raises" to --causes--

Line 10, before "that" insert --in--

Page 5

Line 2, change "into" to --on--

Line 5, delete "externally"

Page 6

Line 10, change "past record of connection" to --a connection record--

Line 14, change "device connected last time" to --previously connected--

Line 20, change "-inhibited" to --copy-inhibited--

Line 25, after "whether" insert --or not--; after "performs" insert --a--; delete "or does"

Page 7

Line 1, delete "not perform recording operation"

Line 6, after "about" insert --a--

Line 7, change "inputable" to --which can be input--

Line 13, change "only with" to --with only--

Line 17, change "certainly" to --reliably--

Line 20, change "only by" to --by only--

Line 21, change "signal capable of" to --signals which can be--

Page 8

Line 8, change "certainly" to --reliably--

Line 11, change "certainly" to --reliably--

Line 12, change "copied easily" to --easily copied--

Line 17, after "output" insert --an--

Page 9

Line 7, delete "the" (third occurrence)

Page 10

Line 13, change "characters" to --numerals--

Line 18, after "recording" insert --an--

Line 21, after "into" insert --a--; after "of" insert --a--

Page 11

Line 20, after "to" insert --a--

Page 13

Line 2, change "part" to --elements--

Line 7, after "into" insert --an--.

Page 16

Line 2, change "switch whether to" to --selectively--

Line 15, change "part" to --elements--

Page 18

Line 9, change "to the outside" to --externally--

Line 20, after "without" insert --being--

Page 20

Line 5, change "and so" to --, and thus--

Page 21

Line 14, after "will" insert --next--

Line 15, after "that" insert --a--

Page 22

Line 17, delete "has shown"

Page 24

Line 1, after "will" insert --next--

Line 19, change "for starting" to --to start--

Page 25

Line 8, change "this" to --the third--; change "shows" to --is directed to--

Line 14, change "no one" to --an operator does not--; change "attends" to --attend--; delete "beside it"

Page 26

Line 3, change "made" to --performed--

Page 27

Line 24, change "have shown" to --relate to an--

Line 25, change "the case where" to --which--; delete "have the function of"

Page 28

Line 1, change "sending" to --send--

Line 4, after "will" insert --next--

Line 17, change "Scrambled" to --A scrambled--

Line 22, change "certainly" to --reliably--

Page 29

Line 5, after "whether" insert --a--; after "through" insert --the recording device--

Line 10, after "of" insert --a--

Line 12, after 'be" insert --easily--

Line 13, delete "with ease"

IN THE CLAIMS:

Please cancel claim(s) 1-12 without prejudice or disclaimer to the subject matter contained therein.

Please add the following new claims:

--13. A video display/record system comprising a video signal recording device, a video signal output device and an external device externally connected to said recording device, wherein said recording device comprises:

an identification signal generating portion for generating a first identification signal indicating performance of said recording device,

an identification signal switching portion receiving at least one second identification signal outputted from said external device and indicating performance of said external device and said first identification signal, for outputting one of said first identification signal and said second identification signal to said video signal output device depending on whether recording operation is performed or not, and

a recording standby signal generating portion for outputting a recording standby signal directing to enter recording operation,

said identification signal switching portion switching whether to output said first identification signal or said second identification signal from said identification signal switching portion on the basis of said recording standby signal, and

said video signal output device comprises:

an identification signal distinguishing portion for distinguishing which of said first and second identification signals from said identification signal switching portion is inputted, and

a screen display resolution setting portion for setting a displayable range of said video signal in accordance with each of said external device and said recording device on the basis of a result of distinction in said identification signal distinguishing portion.

14. A signal processing method for a video display/record system comprising a recording device and at least one external device externally connected to said recording device,

wherein said recording device comprises a recording standby signal generating portion for outputting a recording standby signal directing to enter recording operation, said signal processing method comprising the steps of:

(a) detecting presence/absence of said recording standby signal from said recording standby signal generating portion,

(b) when said recording standby signal is outputted, outputting a first identification signal indicating performance of said recording device from said recording device,

(c) when said recording standby signal is not outputted, reading a second identification signal outputted from said at least one external device and indicating performance thereof,

(d) detecting whether said second identification signal is inputted,

(e) when said second identification signal is detected, outputting said second identification signal, and

(f) when said second identification signal is not detected, outputting said first identification signal from said recording device.--

REMARKS

Claims 13 and 14 are pending in the present application. Claims 1-12 have been cancelled and claims 13 and 14 have been added.

Entry of the above amendments is earnestly solicited. An early and favorable first action on the merits is earnestly solicited.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact D. Richard Anderson (Reg. 40,439) at the telephone number of the undersigned below.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By _____
John A. Castellano, #35,094

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2257-162P

(Rev. 04/19/2000)

PATENT
2257-162P

IN THE U.S. PATENT AND TRADEMARK OFFICE

Applicant: N. KATO

Appl. No.: NEW Group: UNASSIGNED

Filed: September 19, 2000 Examiner: UNASSIGNED

For: RECORDING DEVICE, VIDEO OUTPUT DEVICE, VIDEO DISPLAY/RECORD SYSTEM AND SIGNAL PROCESSING METHOD FOR VIDEO DISPLAY/RECORD SYSTEM

INFORMATION DISCLOSURE STATEMENT
(SUBMISSION WITH CONTINUATION-IN-PART OR RULE 1.53(b) CONTINUATION OR DIVISIONAL APPLICATION)

Assistant Commissioner for Patents
Washington, DC 20231

September 19, 2000

Sir:

Pursuant to 37 C.F.R. §§ 1.97 and 1.98, applicant(s) hereby submit(s) an Information Disclosure Statement for consideration by the Examiner.

I. LIST OF PATENTS, PUBLICATIONS OR OTHER INFORMATION

The patents, publications, or other information submitted for consideration by the Office are listed on the PTO-1449 form(s), attached hereto.

II. REFERENCES PREVIOUSLY CITED OR SUBMITTED

Pursuant to 37 C.F.R. § 1.98(d), consideration of information listed on the PTO-1449 form(s) is requested since any patents, publications, or other information which are listed on the PTO-1449 form(s) but for which copies are not enclosed herewith, were previously cited by or submitted to the PTO in one of the following applications which has been relied upon for an earlier filing date under 35 U.S.C. § 120:

U.S. Appl. No(s).	U.S. Filing Date(s)
08/985,779	December 5, 1997

III. FEES

This Information Disclosure Statement is being filed concurrent with the filing of a continuation-in-part, continuation, or divisional patent application; therefore, no fee is required.

If the Examiner has any questions concerning this IDS or requires a copy of any of the references cited but not provided, he/she is requested to contact the undersigned. If it is determined that this IDS has been filed under the wrong rule, the PTO is requested to consider this IDS under the proper rule (with a petition if necessary) and charge the appropriate fee to Deposit Account No. 02-2448.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fee required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By _____ #35,094
John A. Castellano, #35,094

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JAC/DRA/lab
2257-162P

Enclosures:
- ☒ PTO-1449
- ☐ References
- ☐ Foreign Search Report
- ☐ Other:

(Rev. 04/19/2000)

Form PTO-1449

INFORMATION DISCLOSURE CITATION IN AN APPLICATION

(Use several sheets if necessary)

ATTY DOCKET NO.	APPLICATION NO.
2257-162P	NEW
APPLICANT: N. KATO	
FILING DATE: September 19, 2000	GROUP: Unassigned

U.S. PATENT DOCUMENTS

EXAMINER INITIAL	DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS	FILING DATE IF APPROPRIATE
	5 8 1 5 6 3 1	1998-09-29	Sugiyama et al.			
	5 7 4 2 2 8 5	1998-04-21	Ueda			
	5 8 8 3 6 1 3	1999-03-16	Iwaki			
	5 4 3 6 6 1 8	1995-07-25	Van Steenbrugge			
	5 2 5 5 0 9 7	1993-10-19	Spiero et al.			
	4 8 0 8 9 9 2	1989-02-28	Beyers, Jr. et al.			

FOREIGN PATENT DOCUMENTS

	DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUB CLASS	TRANSLATION YES	TRANSLATION NO
	A8- A 5 1 8 5 6	1996-11-12	JAPAN			**	

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, etc.)

EXAMINER	DATE CONSIDERED

EXAMINER: Initial if citation considered, whether or not citation is in conformance with M P E P 609, Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant

** partial

JAC/DRA/lab

TITLE OF THE INVENTION

Recording Device, Video Output Device, Video Display/Record System and Signal Processing Method for Video Display/Record System

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to recording devices, video output devices, video display/record systems, and signal processing methods for the video display/record systems, and particularly to a recording device, a video output device, a video display/record system, and a signal processing method for the video display/record system which are capable of identifying devices connected to the video output device.

Description of the Background Art

Described below as an example of a common device for outputting RGB video is a video system adapted to DDC (Display Data Channel) standard (fully described later), specifically a video I/F system which is adopted in a personal computer system or the like and which is provided with functions of outputting video signal and making bi-directional communication between a video display device and a video output device.

Such a video system includes video output equipment having a plurality of video output modes so that it can limit the mode for outputting the video signal according to specifications (performance) of the display device connected thereto. (It can change the displayable range of the video signal outputted from the video output equipment in accordance with specifications of the display device.)

The above-mentioned DDC standard by VESA (Video Electronics Standard Associate) will now be described. The DDC is a system for enabling equipment (e.g., a display device) connected to the RGB terminal of a computer to send information including the displayable resolution range of the monitor to the computer.

Suppose that video outputted to the analog RGB output terminal of the video output device, such as a computer, is recorded. In this case, the devices may be connected as shown in Fig.8, for example.

Fig.8 shows a conventional structure for connecting a video display device and a video output device, wherein the video output device and the display device are directly connected, with a recording device additionally connected on the connecting line therebetween.

In Fig.8, the reference numeral 1 denotes a recording device capable of recording analog RGB video signal, 11 denotes a recording signal processing portion for applying recording processing to the video signal, 12 denotes a video signal converting portion, 13 denotes a recording operation input portion for input of a recording command signal, and 14 denotes a switching portion for switching the input of the video signal on the basis of the recording command signal. The reference numeral 2 denotes a video display device for displaying the video signal, 21 denotes an identification signal generating portion for outputting an identification signal (hereinafter referred to as an ID signal) indicating performance etc. of the video display device, 22 denotes a video signal processing portion, and 23 denotes a video signal display portion. The reference numeral 5 denotes a storage medium in which at least information by digital signal such as video information by digital video signal is stored, which is a recording disk, for example. The reference

numeral 6 denotes a reconstructing device for reconstructing the digital signal from a storage medium containing digital information, e.g., the recording disk 5.

The reference numeral 3 denotes the body of a computer, 31 denotes a digital reconstruction processing portion for performing signal processing to the signal reconstructed in the reconstructing device 6, and 32 denotes a CPU (Central Processing Unit) for controlling the computer. The reference numeral 4 denotes an analog video signal output processing portion provided in the computer 3 for applying processing such as analog conversion to the digital video signal, 41 denotes an identification signal distinguishing portion for identifying an ID signal inputted from external equipment connected to the computer 3, 42 denotes a video data analog converting portion for applying analog conversion processing to the digital signal reconstructed from the recording disk 5, and 43 denotes a screen display resolution setting portion for setting the screen display resolution according to the range of the video signal which the display device can display.

Next, operation of the structure above is described. When recording the video signal outputted from the analog RGB terminal of the video output device, or the computer, the devices may be connected as shown in Fig.8.

Described here is a process in which the video signal outputted from the analog video signal output portion 4 of the computer 3, or the video output device, is converted into signal recordable in the recording device and then recorded.

In the case of the video display/record system shown in Fig.8, the ID signal outputted from the identification signal generating portion 21 in the display device 2 by the DDC system is inputted into the computer 3. This enables the computer 3 to select video signal within the range of the video signal displayable by the display device 3. When a previously set display resolution is out of the range, the

closest resolution is selected in the range to output the video signal.

As stated above, in a conventional video input/output system formed of the computer 3, the recording device 1, and the video display device 2, the equipment connected to the computer 3 is recognized as a video display device by the DDC system and therefore the displayable range (resolution, frequencies of vertical/horizontal synchronizing signals, etc.) of the video signal outputted from the computer 3 is adapted to the specification of the video display device. Accordingly, the video signal may be outputted from the computer 3 in a display range (resolution, frequencies of vertical/horizontal synchronizing signals) which cannot be recorded by the recording device. This raises a first problem that when recording with a recording device it is necessary to provide a command for change through the CPU 32 to the screen display resolution setting portion 43 so as to change the displayable range of the video signal outputted from the computer 3 to such video signal as can be inputted to the recording device.

Furthermore, even if the recording disk 5 subjected to reconstruction in the reconstructing device 6 is copy-protected, the analog RGB video signal is always outputted from the analog video signal output processing portion 4. The analog RGB video signal outputted from the analog video signal output processing portion 4 can therefore be inputted to the recording device, which raises a second problem that the recording device 1 can easily record or copy the video signal even if the video source outputted from the analog video signal output processing portion 4 (the video output device) is copy-inhibited to protect copyright or secret information.

SUMMARY OF THE INVENTION

According to the present invention, a recording device for recording a video signal into a storage medium comprises: an identification signal generating portion for generating a first identification signal indicating performance of the recording device; and an identification signal switching portion receiving at least one second identification signal outputted from an external device externally connected to the recording device and indicating performance of the external device, and the first identification signal, for outputting one of the first identification signal and the second identification signal as a control signal to the external device depending on whether recording operation is performed or not.

According to the present invention, a video signal output device comprises: a copy flag detecting portion for detecting a signal indicating copy protect from a digital video signal including the signal indicating copy protect and digital video data; an identification signal distinguishing portion receiving and distinguishing an identification signal outputted from at least one external device externally connected to the video signal output device and indicating performance of the at least one external device; a screen display resolution setting portion receiving the digital video data read from the digital video signal and for setting a displayable range of the digital video data in accordance with each of the at least one external device on the basis of a result of distinction made in the identification signal distinguishing portion; a video data analog converting portion connected to the screen display resolution setting portion for converting the digital video data into an analog video signal; a signal output enable/disable determining portion for determining whether to output the analog video signal to the at least one external device on the basis of a result of detection in the copy flag detecting portion and a result of distinction in the identification signal distinguishing portion; and a video output determining

portion connected to the video data analog converting portion and at least having a function of determining whether to output the analog video signal to the at least one external device in accordance with a result of determination in the signal output enable/disable determining portion.

According to the present invention, a signal processing method for a video display/record system comprising a video signal output device and at least one external device externally connected to the video signal output device comprises the steps of: (a) in the video signal output device, detecting an identification signal outputted from the at least one external device and indicating performance thereof; (b) checking past record of connection of the at least one external device connected to the video signal output device on the basis of the identification signal; (c) setting a displayable range of video signal outputted from the video output device in accordance with the at least one external device when the at least one external device is different from a device connected last time; (d) checking to see whether the at least one external device has a recording function; (e) when the at least one external device has no recording function, converting the video signal into an analog video signal and outputting the analog video signal from the video output device; (f) when the at least one external device has a recording function, reading a copy allowing/inhibiting flag indicating whether the video signal is copy-allowed or -inhibited to determine whether the video signal can be copied; (g) when the video signal is copy-allowed, outputting the analog video signal from the video output device; and (h) when the video signal is copy-inhibited, determining in which form the analog video signal is to be outputted.

According to the present invention, the identification signals can be switched depending on whether the recording device performs recording operation or does

not perform recording operation. This provides a recording device capable of sending appropriate control information to a device connected to the recording device depending on whether recording operation is performed.

According to the present invention, the identification signal switching portion can be switched on the basis of the recording standby signal. Accordingly, when the recording device performs recording, it is possible to send information about video signal inputable to the recording device to an external device connected to the recording device.

According to the present invention, when recording, information about the recording device can be automatically sent to an external device connected to the recording device, and when not recording, information about another external device connected to the recording device can be sent through the recording device.

According to the present invention, it is possible, only with a single input operation, to cause the recording standby signal generating portion to operate to output the recording standby signal, and to output a recording command signal, so as to send information about the recording device to a device connected to the recording device. The video signal can thus be certainly recorded.

According to the present invention, as the power–supply is turned on to operate the recording device, a standby command signal for commanding output of the recording standby signal is provided. Accordingly, it is possible, only by turning on the power–supply, to send information about video signal capable of input to the recording device to a device connected to the recording device.

According to the present invention, when only a device for outputting video (a video output device) is connected to the recording device, only the information based on the identification signal of the recording device is sent to the video output

device. Therefore various conditions for the video signal and the like can be optimized between the recording device and the video output device connected to the recording device.

According to the present invention, it is possible to output the analog video signal in a scrambled form.

According to the present invention, when reconstructing from a copy-protected video software, outputting the video signal is not allowed if the device connected to the video output device cannot be identified. This certainly prevents the video software from being copied. When it cannot be determined whether the device connected to the video output device has a function of recording the information on the video software, the video signal is not outputted, thus certainly preventing the video software from being copied easily.

According to the present invention, when a recording device is connected to the video output device, it is possible to surely set the video signal within the displayable range which can be inputted to the recording device.

According to the present invention, a specific method is obtained for appropriately determining whether to output analog video signal of video software depending on whether the video software is copy-protected and depending on the kind of the external device connected to the video output device.

The present invention has been made to solve the above-described first problem. An object of the invention is to provide a recording device, a video output device, a video display/record system and a signal processing method for the video display/record system in which the video output device can identify the recording device, and the displayable range (resolution, frequencies of horizontal/vertical synchronizing signals) of the video signal outputted from the

video output device can be changed depending on whether the video signal is recorded or not to appropriately change the image display.

Further, the present invention has been made to solve the above-described second problem. An object of the present invention is to provide a recording device, a video output device, a video display/record system and a signal processing method for the video display/record system wherein the video signal outputted from the video output device is restricted in accordance with the type of the video source and equipment connected thereto.

These and other objects, features, aspects and advantages of the present invention will become more apparent from the following detailed description of the present invention when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig.1 is a diagram showing a video display system formed of a recording device, a video display device and a video output device according to a first preferred embodiment of the present invention.

Figs. 2A and 2B are diagrams showing the connector portion of the video display device.

Fig.3 is a flow chart showing processing in the video display system of the present invention.

Fig.4 is a flow chart showing processing in the video display system of the present invention.

Fig.5 is a diagram showing the displayable range of the video signal of the video display device.

Fig.6 is a diagram showing a video display system formed of a recording

device, a video display device, and a video output device according to a second preferred embodiment of the present invention.

Fig.7 is a diagram showing a video display system formed of a recording device, a video display device, and a video output device according to the second preferred embodiment of the present invention.

Fig.8 is a diagram showing a conventional video display system.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Preferred embodiments of the present invention will now be described referring to the drawings.

<First Preferred Embodiment>

A first preferred embodiment of the present invention will now be described. In the block diagram shown in Fig.1, the same reference characters show the same components as those in the conventional example shown in Fig.8.

Fig.1 shows structures of a video signal output device and a recording device according to the present invention.

In Fig.1, the reference numeral 1 denotes a recording device capable of recording analog RGB video signal, 8 denotes a connector output portion, 11 denotes a record signal processing portion for performing recording processing to the video signal, 12 denotes a video signal converting portion for converting the RGB video signal inputted to the recording device 1 into video signal of NTSC system, 13 denotes a recording operation input portion for inputting a recording command signal, 14 denotes a switching portion for switching the input of the video signal on the basis of the recording command signal, 15 denotes an identification signal generating portion for generating an identification signal

indicating performance etc. of the recording device, 16 denotes a recording standby switch (a record starting portion) which is operated prior to recording operation, 17 denotes a return identification signal distinguishing portion for distinguishing presence/absence of an identification signal from equipment connected to the connector output portion 8 of the recording device 1, 18 denotes a recording standby signal generating portion receiving the signal from the recording standby switch 16 and the signal from the return identification signal distinguishing portion 17 for checking the two signals to output a recording standby signal to instruct whether to enter recording operation, and 19 denotes a switching portion (an identification signal switching portion) for outputting one of the identification signals from the identification signal generating portion 15 and an external device connected to the connector portion in accordance with the signal from the recording standby signal generating portion 18.

The reference numeral 2 denotes a video display device for displaying the video signal, 21 denotes an identification signal generating portion for outputting an identification signal indicating performance etc. of the video display device 2, 22 denotes a video signal processing portion, and 23 denotes a video signal display portion.

The reference numeral 3 denotes the body of a computer, 31 denotes a digital reconstruction processing portion for applying signal processing to signal reconstructed in the reconstructing device 6, 32 denotes a CPU (Central Processing Unit) for controlling the computer, 33 denotes a scramble canceling portion for canceling scramble processing if the recording disk 5 is scrambled for copy protection, and 34 denotes a copy allowing/inhibiting flag detecting portion for detecting whether the software reconstructed in the reconstructing device 6 is

subject to copy protection.

The reference numeral 4 denotes an analog video signal output processing portion connected to the computer 3 for processing, e.g., analog–converting, the digital video signal, 41 denotes an identification signal distinguishing portion for identifying an ID signal inputted from external equipment connected to the computer 3, and 43 denotes a screen display resolution setting portion for setting the screen displayable range (resolution, frequencies of horizontal/vertical synchronizing signals, etc.) on the basis of the ID signal of the external equipment identified in the identification signal distinguishing portion 41.

The reference numeral 44 denotes a video data analog converting portion for analog–converting the digital signal reconstructed from the software, e.g., the recording disk 5 on the basis of a command for setting from the screen display resolution setting portion 43, 45 denotes a video output enable/disable determining portion for determining whether to enable or disable video output on the basis of the copy allowing/inhibiting flag and the ID signal of the external equipment, and 46 denotes a video output determining portion for scrambling the analog video signal outputted from the video data analog converting portion 44 or disabling the video output on the basis of the output from the video output enable/disable determining portion 45.

Next, operation of the first preferred embodiment constructed as described above will be described. A D–sub type connector adapted to the DDC standard is used to connect the devices shown in Fig.1, for example. In this structure, the ID signals (identification signals) of the devices according to the DDC system can be sent to the video output device by connecting the video output device and the recording device, and the recording device and the video display device through the

connector.

Operation of the part related to the recording device 1 and the video display device 2 in the system shown in Fig.1 will be described.

In the recording device 1, the video signal converting portion 12 converts the analog RGB video signal (VGA image signal:Video Graphic Array image signal) outputted from the analog video signal output processing portion 4 in the computer 3 into NTSC signal and the recording processing portion 11 records the signal into a storage medium such as the video tape 7. It can also output the analog RGB video signal in a through manner or output the video signal converted into the NTSC signal.

The analog RGB video signal outputted from the recording device 1 is processed in the video signal processing portion 22 in the video display device 1 and displayed as an image in the video display portion 23.

In the recording device 1, the switching portion 19 receives the ID signal from the identification signal generating portion 21 in the video display device 2 through the connector output portion 8. This ID signal indicates characteristic information of the video display device 2, such as the name of the manufacturer, the name of the model, the video displayable range (resolution, horizontal/vertical scanning frequencies) etc. The switching portion 19 also receives the ID signal outputted from the identification signal generating portion 15 in the recording device 1. This ID signal indicates characteristic information of the recording device 1, such as the name of the manufacturer, the name of the model, the range of the input-able video signal, etc.

The switching portion 19 is switch-controlled on the basis of the output from the recording standby signal generating portion 18. The recording standby signal

generating portion 18 is supplied with the ID signal from the return identification signal distinguishing portion 17 and an ON/OFF signal of the recording standby switch 16.

The identification signal is outputted from the connector 9 of the video display device 2. The connector 9 has the structure shown in Fig.2A, whose signal inputs and outputs are related as shown in Fig.2B.

When the ID signal indicating the video display device 2 is outputted from the return identification signal distinguishing portion 17 into the recording standby signal generating portion 18, the switching portion 19 is switched to the side–b so that the ID signal inputted to the recording device 1 is externally outputted as it is. The ID signal passed through the recording device 1 is inputted to the identification signal distinguishing portion 41 in the analog video signal output processing portion 4.

Next, when a recording standby ON signal is inputted from the recording standby switch 16 into the recording standby signal generating portion 18, the switching portion 19 is switched to the side–a independently of the presence/absence of the signal input from the return identification signal distinguishing portion 17, so that the ID signal of the recording device 1 from the identification signal generating portion 15 is outputted to the outside.

Suppose that the analog RGB video signal is recorded in the recording device 1. As for the screen display resolution of the video signal, the screen display resolution setting portion 43 in the analog video signal output processing portion 4 determines the resolution, the frequencies of the horizontal/vertical synchronizing signals, etc. on the basis of the ID signal from the video display device 2. Since the screen displayable range is thus set in accordance with the characteristics of the

video display device 2, it is necessary when recording to reset it so that the video signal can be inputted to the recording device 1. Or, it is necessary to confirm whether the video signal can be inputted thereto. Provided for this purpose is the recording standby switch 16. The recording standby switch 16 is turned on before recording to cause the displayable range of the analog RGB video signal outputted from the analog video signal processing portion 4 to be changed.

Thus, when recording, the switching portion 19 is switched with a command from the recording standby switch 16 to input the ID signal of the recording device 1 into the identification signal distinguishing portion 41 in the analog video output portion 4 to instruct the screen display resolution determining portion 43 to change the setting of the display range so that the video signal can be inputted to the recording device 1. Then a recording command is inputted from the recording operation input portion 13 to start recording.

Since the recording device shown in this preferred embodiment is capable of input of VGA image signal (640×480 lines, fh:31.5 kHz/fv:60 Hz), for example, the screen display resolution setting portion 43 makes setting adapted to the VGA image signal.

The VGA image signal inputted to the recording device 1 is converted into NTSC signal (fh:15.75 kHz/fv:60 Hz) in the video signal converting portion 12 and is recorded into a storage medium, e.g., the video tape 7, in the record signal processing portion 11.

Although the description above has shown an example in which the screen display resolution of the video signal is set for the VGA image signal when the recording standby switch 16 is turned on, the setting of the display range is not limited to that adapted to the VGA image signal. The video signal can be

converted into any video signal that the recording device can input or record.

According to this recording device, it is possible to switch whether to output an ID signal of a device connected to the recording device or to output the ID signal of the recording device depending on whether recording is done or not. Further, when the externally connected device is changed, the ID signal of that device can be outputted. Hence, the video display mode can be switched to a suitable one on each occasion, which, unlike the conventional systems, eliminates the necessity of manually switching the video display mode every time the externally connected device is changed.

According to this recording device, the displayable range of the video signal outputted from the video output device (the computer 3 and the analog video signal output processing portion 4) can be automatically changed by turning on the recording standby switch. Accordingly, unlike in the conventional systems, it is not necessary to manually switch the video display mode.

Described next is operation of the part related to the computer 3 and the analog video signal output processing portion 4 in the system shown in Fig.1.

The video software such as the recording disk 5 is read in the reconstructing device 6 and the read digital video signal is inputted to the digital reconstruction processing portion 31. The digital video signal reconstructed in the digital reconstruction processing portion 31 is inputted to the scramble canceling portion 33. When the disk 5 is copy-protected or scrambled, the scramble canceling portion 33 cancels the processing and then outputs the digital video data. The digital reconstruction processing portion 31 and the scramble canceling portion 33 may be operation-controlled through the CPU 32 or may be operation-controlled in the scramble canceling portion 33.

The digital video data scramble-canceled in the scramble canceling portion 33 is inputted to the screen display resolution setting portion 43, and information indicating that the data had been scrambled is inputted to the copy allowing/inhibiting flag detecting portion 34. The copy allowing/inhibiting flag detecting portion 34 detects the copy allowing/inhibiting flag and sends a signal indicating copy inhibition or a signal indicating copy allowance to the video output enable/disable determining portion 45.

The video output enable/disable determining portion 45 receives an ID signal indicating characteristics and performance of the externally connected equipment through the identification signal distinguishing portion 41 to acquire information about the externally connected equipment.

When the externally connected equipment is the recording device 1, the switching portion 19 selects the ID signal to output. The switching portion 19 is switched depending on whether recording operation is performed or not, so that the ID signal of the recording device 1 or an ID signal of a device connected to the recording device 1, e.g., the video display device 2, is externally outputted from the recording device 1.

The identification signal distinguishing portion 41 outputs the ID signal of the externally connected equipment to the screen display resolution setting portion 43. The screen display resolution setting portion 43 receives the ID signal to acquire information about the video displayable range that the externally connected equipment can deal with.

The video display device can display the video ranges shown in Fig.5, for example. The settings vary depending on the video display device. A resolution or horizontal/vertical scanning frequencies that can be set in the monitor A can, or

cannot be set in the monitor B, monitor C, or the monitor D. Hence the screen display resolution must be set in accordance with the video display device. In Fig.5, O indicates displayable and x indicates undisplayable.

The screen display resolution setting portion 43 sets the screen display resolution on the basis of the ID signal and the video data analog converting portion 44 converts the digital video data into analog RGB video signal. The analog RGB video signal is inputted to the video output determining portion 46, where it is determined whether to output the signal as the analog RGB video signal to the outside. This determination is made on the basis of the signal from the video output enable/disable determining portion 45 inputted to the video output determining portion 46.

The output from the video output enable/disable determining portion 45 is determined on the basis of the signals sent from the identification signal distinguishing portion 41 and the copy allowing/inhibiting flag detecting portion 34.

First, suppose that a signal indicating copy inhibition is inputted from the copy allowing/inhibiting flag detecting portion 34. At this time, if the ID signal of the video display device 2 is inputted from the identification signal distinguishing portion 41 to the video output enable/disable determining portion 45, the analog RGB video signal inputted to the video output determining portion 46 is outputted to the video display device 2 without subjected to any special processing.

Next, if the ID signal of the recording device 1 is inputted from the identification signal distinguishing portion 41, the video signal output determining portion 46 stops outputting the input analog RGB video signal, or outputs the analog RGB video signal in a scrambled form.

When a signal showing that the disk 5 is copy-allowed is outputted from the

copy allowing/inhibiting flag detecting portion 34, the video output enable/disable determining portion 45 outputs a signal for allowing the video signal to be outputted to the video output determining portion 46, independently of the source of the ID signal sent from the identification signal distinguishing portion 41.

As stated above, the video output enable/disable determining portion 45 recognizes whether the copy allowing/inhibiting flag indicates copy-allowed or-inhibited and also recognizes from which device the ID signal has come, to determine whether to output the video signal reconstructed from the video software, or the recording disk 5, from the video output device (the computer 3 and the analog video signal output processing portion 4).

With this structure, it is possible to stop outputting the analog RGB video signal of the video software from the video output device (the computer 3 and the analog video signal output processing portion 4) or to apply scramble processing to the analog RGB video signal when the reconstructed video software or the disk 5 is copy-protected. Then the recording device cannot record, or even if it can, the recorded image is visually unintelligible.

Fig.3 is a flow chart showing a flow of processing in the video display system formed of the video display device, the recording device, and the video output device shown in Fig.1. Described next are the setting of the displayable resolution range of the video signal in this system and the processing of determining output of the analog RGB video signal.

First, another device is connected to the video output device (the computer 3 and the analog video signal output processing portion 4) in step ST1.

Next, an ID signal sent from the device connected to the video output device is detected and identified in the identification signal distinguishing portion 41 (step

ST2).

The identification signal distinguishing portion 41 distinguishes the model of the device and also checks whether the device is the same as that connected thereto when video software was reconstructed last time to see if the connected device has been changed (step ST3). If the connected device has been changed and so the ID signal has been changed, it instructs the screen display resolution setting portion 43 to restrict the video signal output within the video displayable range of the connected device (step ST4).

The video displayable range is classified as shown in Fig.5, for example. With this operation, the video displayable range can be automatically changed when the connected device is changed. It is therefore not necessary to manually switch the video display mode, unlike in the structure connected on the basis of the signal distribution shown in the conventional example.

The identification signal distinguishing portion 41 also determines whether the device connected to the video output device has a recording function (step ST5). If it determines that the connected device doesn't have a recording function but displays the video in a real–time manner, like the video display device 2, it outputs the determination to the video output enable/disable determining portion 45 so that the video output enable/disable determining portion 45 provides an output enable signal for the analog RGB video signal to the video output determining portion 46 (step ST8).

If it is determined in step ST5 that the connected device has a recording function, the copy allowing/inhibiting flag detected in the copy allowing/inhibiting flag detecting portion 34 is read (step ST6). When the copy allowing/inhibiting flag shows copy allowance, the result of determination is outputted to the video

output enable/disable determining portion 45 so that the video output enable/disable determining portion 45 provides the output enable signal for the analog RGB video signal to the video output determining portion 46 (step ST8).

When a recording command is inputted from the recording operation input portion 13 in the recording device 1, the picture displayed in the video display device 2 is recorded into a storage medium such as the video tape 7.

If the copy allowing/inhibiting flag checked in step ST7 shows that the video software is copy-protected, the video output determining portion 46 determines to stop outputting the analog RGB video signal, or to output it in a scrambled form (step ST9).

Subsequently, the flow returns to step ST2 to enter the mode for detecting the ID signal of the connected device and the operation in and after step ST3 for monitoring whether the connected device is changed is repeated.

A more specific example of actual operation will be described.

For example, suppose that video signal is being reconstructed from a copy-protected video software such as the recording disk 5 in the system connected as shown in Fig.1 in a mode with a resolution of 800×600, with the recording standby switch 16 turned off. The copy allowing/inhibiting flag shows copy-inhibited, but the video signal is outputted to the video display device 2 since the ID signal from the external device connected to the video output device (the computer 3 and the analog video signal output processing portion 4) indicates the video display device 2 which displays the video in a real-time manner, so that the user can enjoy the video software.

Next, in order to record the video software, the user turns on the recording standby switch 16 to change the displayable range of the video signal so that the

recording device 1 can record it. Then, the video output device changes the output video signal displayable range to the mode with a display resolution of 640×480 which can be recorded in the recording device 1. The resolution of the video signal recorded in the recording device 1 can be confirmed with this change in setting, but the video output determining portion 46 stops outputting the video signal since the currently reconstructed video software is copy-protected as stated above and the copy allowing/inhibiting flag therefore shows copy "inhibited." When the output of the video signal is stopped, the screen displays that this video software cannot be recorded to let the user know that he/she cannot record it.

Next, when the user gives up recording and turns the recording standby switch 16 off, the ID signal of the video display device 2 is inputted to the video output enable/disable determining portion 45 again. Then the video output determining portion 46 enables video signal output so that the user can see the video software with the video display device 2 again.

<Second Preferred Embodiment>

The first preferred embodiment has shown, as depicted in Fig.1, a structure in which the recording standby switch 16 is provided as an input portion separated from the recording operation input portion 13 for outputting a command for starting recording. However, it may be constructed, as shown in Fig.6, as a recording start switch 16A (a record starting portion) having the functions of both of the recording standby switch 16 and the recording operation input portion 13.

When the recording start switch 16A is turned on, first, a recording standby ON signal is inputted to the recording standby signal generating portion 18 and the switching portion 19 is switched to the side-a so that the ID signal of the recording

device 1 is sent from the identification signal generating portion 15 to the video output device (the computer 3 and the analog video signal output processing portion 4). Subsequently, a recording command is automatically applied to the switching portion 14 for switching input of the video signal. The video output device performs the individual steps described referring to Fig.3, so that the video signal is set within the displayable range which is recordable in the recording device 1. Further, it selects whether to output the changed analog RGB video signal, or to stop outputting the analog RGB video signal, or to output the signal in a scrambled state. When the analog RGB video signal is outputted, the recording device 1 can record the video signal.

With the recording start switch 16A having both of the functions of the recording standby switch 16 and the recording operation input portion 13, it is possible to change the screen mode and make an instruction for recording with a single switch operation (input operation).

<Modification>

The structure may be constructed so that the screen displayable range can be set when the power-supply for the recording device 1 is turned on.

For example, a user may watch the video signal outputted from the video output device (the computer 3 and the analog video signal output processing portion 4) with the video display device without turning on the power-supply of the recording device. In this case, if the power-supply of the recording device is turned on, it is clear that it is turned on to record the video. Accordingly, if the recording standby switch 16 is electrically connected to a power-supply unit PU as shown in Fig.7, the screen displayable range can be set at the same time when the power-supply of the recording device 1 is turned on.

This operation will be described. When the power-supply of the recording device 1 is turned on (main power-supply ON), a switch SW built in the power-supply unit PU is turned on to give an electric signal to the recording standby switch 16. Then a recording standby ON signal is sent from the recording standby switch 16 to the recording standby signal generating portion 18, and the switching portion 19 is switched to the side-a so that the ID signal of the recording device 1 from the identification signal generating portion 15 is provided to the video output device (the computer 3 and the analog video signal output processing portion 4).

The video output device passes through the individual steps described referring to Fig.3 to set the video signal within the displayable range which the recording device 1 can record and to select whether to output the analog RGB video signal, or to stop outputting the analog RGB video signal, or to output the signal in a scrambled form. When the analog RGB video signal is outputted, the recording device 1 can record the signal.

Since the video signal can be set within such a screen displayable range as can be inputted to the recording device 1 at the same time that the power-supply of the recording device 1 is turned on, the user can instruct the recording operation input portion 13 to give a command for starting recording while watching the video signal in the video display device 2 with the same resolution as that of the video signal recorded in the recording device 1. Then the user will not confuse the recorded image and the image displayed in the video display device 2 since the video displayable range has been set before the recording operation.

When the displayable range is not set according to the recording device 1, the recording operation may be disabled, since the video signal is outputted in an

output mode in such a range that the video display device can display and the selected resolution may be set out of the range of the video signal recordable in the recording device. The above–described structure can prevent this problem.

<Third Preferred Embodiment>

While the first preferred embodiment has shown a structure in which two devices, the recording device and the video display device, are connected to the video output device, this preferred embodiment shows a structure in which only a recording device is connected thereto.

Only the recording device 1 may be connected to the video output device (the computer 3 and the analog video signal output processing portion 4), specifically the video display device 2 may not be connected in the following cases: For example, when a computer (the video output device) is used merely to control the hardware and no one usually attends to the operation beside it or it is controlled by remote operation with a communication system built in the computer, it is not always necessary to monitor the video output in a real time manner but it may be desirable to record the operating state.

For another example, when the video output of the computer can be displayed through another digital interface (I/F) (for example, a liquid crystal monitor can display the digital video data as it is without an analog I/F), it is not necessary to connect a video display device to the analog video output terminal. Then a recording device which can record the analog RGB video signal outputted from the video output device, e.g., the computer 3, may be connected to the analog video output terminal.

Operation in the case where only the recording device 1 is connected to the

video output device (the computer 3 and the analog video signal output processing portion 4) will be described referring to Fig.1 and Fig.4. Fig.4 is a flow chart showing processing made when only the recording device is connected to the video output device.

In this case, since no external device is connected to the recording device 1, only the ID signal of the recording device 1 is sent to the video output device. Accordingly, when the return identification signal distinguishing portion 17 detects absence of input of ID signal from the video display device 2 and determines that no device is connected to the recording device, the recording standby signal generating portion 18 may force the standby switch 16 to turn on, or the recording standby signal generating portion 18 may switch the switching portion 19 to the side–a so that the ID signal of the recording device 1 is always inputted to the video output device 3.

The processing will be described referring to the flow chart in Fig.4.

The power–supply of the recording device 1 is turned on in step ST11 and the recording standby signal generating portion 18 reads input from the recording standby switch 16 (step ST12). Then the recording standby signal generating portion 18 determines whether the recording standby switch 16 is ON or OFF (step ST13).

When it is determined that the recording standby switch 16 is ON, the switching portion 19 is switched to the side–a and the ID signal of the recording device 1 is outputted to the video output device (the computer 3 and the analog video signal output processing portion 4 : step ST17). The displayable range of the output video signal is then set so that the video signal can be recorded in the recording device.

If it is determined in step ST13 that the recording standby switch 16 is not ON, a return ID signal input from a device connected to the recording device 1 is read in the recording standby signal generating portion 18 (step ST14).

The recording standby signal generating portion 18 then determines presence/absence of input of the ID signal (step ST15). If it determines that no ID signal is inputted, the switching portion 19 is switched to the side–a and the ID signal of the recording device 1 is outputted to the video output device (the computer 3 and the analog video signal output processing portion 4: step ST17).

If it is determined in step ST15 that an ID signal is inputted, the switching portion 19 is switched to the side–b and the ID signal of the externally connected device (the video display device 2) is outputted to the video output device (step ST16).

It is thus determined whether a video display device is connected to the recording device, and when no device is connected, the ID signal of the recording device 1 is sent to the video output device 3 in a forced manner and setting of the displayable range of the video signal is changed.

When only the recording device 1 is connected, it is possible to always set the displayable range (resolution, frequencies of horizontal/vertical synchronizing signals) of the video signal outputted from the video output device 3 to the resolution recordable in the recording device 1. Accordingly, if video software is record–allowed (copy–allowed video software), it can be recorded with ease.

<Fourth Preferred Embodiment>

While the preferred embodiments described above have shown operation in the case where devices connected to the video output device have the function of

sending the identification signal (ID signal), this preferred embodiment assumes that a device having no identification signal sending function, such as a device not adapted to DDC, is connected to the video output device. Operation of the video output device in the case where a DDC–unadapted device is connected will be described.

When a DDC–unadapted device is connected to the video output device, the identification signal distinguishing portion 41 cannot identify it since no ID signal is sent from the device. However, it determines unidentifiable also when no device is connected or when a display device of an old model is connected.

When the identification signal distinguishing portion 41 determines unidentifiable (no DDC signal), a signal indicating that a device having a recording function is connected is sent to the video output enable/disable determining portion 45. The video output enable/disable determining portion 45 is supplied with the copy allowing/inhibiting flag read from the disk 5 from the copy allowing/inhibiting flag detecting portion 34. When the copy allowing/inhibiting flag indicates copy "inhibited," the video output determining portion provides a command to stop video output, and therefore the video is not outputted. Scrambled video signal may be outputted. When the copy allowing/inhibiting flag indicates copy "allowed," it is allowed to output the video signal.

With this structure, when a device connected to the video output device cannot be identified and if the video software is copy–protected, the video signal is not outputted or outputted in a scrambled form. This certainly prevents the video from being copied when a device which, as shown in this preferred embodiment, is not adapted to the copy protection system and does not have a function of sending an identification code (no ID signal output) is connected to the system.

As described above, according to the preferred embodiments of the present invention, in a structure formed of a video output device and a video display device, and a video recording device interposed between the two devices, equipment identification signals are outputted in such a way that they are switched depending on whether recording operation is performed or the video from the output device is passed through. This structure enables the video signal output range to be restricted in accordance with the two kinds of devices, thereby eliminating the necessity of changing the display mode by troublesome manual setting.

Furthermore, a structure is realized in which output of video signal is limited when the video source in the video signal output device is copy-protected for the purpose of protecting copyright or protecting secret information so that it cannot be recorded or copied with ease.

Moreover, merely with a hardware structure having a video output enable/disable determining system built in the video output device and a change-over switch for the identification codes in the recording device, a system for automatically changing the display resolution and a system for applying copy-protected processing to copy-inhibited video software can be easily provided while using an existing display system as it is.

While the invention has been described in detail, the foregoing description is in all aspects illustrative and not restrictive. It is understood that numerous other modifications and variations can be devised without departing from the scope of the invention.

We claim:

1. A recording device for recording a video signal into a storage medium, comprising:

an identification signal generating portion for generating a first identification signal indicating performance of said recording device; and

an identification signal switching portion receiving at least one second identification signal outputted from an external device externally connected to said recording device and indicating performance of said external device, and said first identification signal, for outputting one of said first identification signal and said second identification signal as a control signal to external of said recording device depending on whether recording operation is performed or not.

2. The recording device according to claim 1, wherein said identification signal switching portion outputs said first identification signal when recording operation is performed and outputs said second identification signal when recording operation is not performed.

3. The recording device according to claim 1, further comprising a recording standby signal generating portion for outputting a recording standby signal directing to enter recording operation,

wherein said identification signal switching portion switches whether to output said first identification signal or said second identification signal from said identification signal switching portion on the basis of said recording standby signal.

4. The recording device according to claim 3, wherein said identification signal switching portion outputs said first identification signal when said recording standby signal is inputted from said recording standby signal generating portion and outputs said second identification signal when said recording standby signal is not inputted.

5. The recording device according to claim 3, further comprising a record starting portion for outputting a standby command signal for commanding said recording standby signal generating portion to output said recording standby signal and also outputting a recording command signal for commanding that the video signal be recorded into said storage medium,

wherein said record starting portion outputs said standby command signal and said recording command signal in response to a single input operation.

6. The recording device according to claim 3, further comprising a record starting portion for outputting a standby command signal for commanding said recording standby signal generating portion to output said recording standby signal,

wherein said record starting portion automatically outputs said standby command signal when a power–supply for operating said recording device is turned on.

7. The recording device according to claim 3, further comprising an identification signal distinguishing portion for distinguishing presence/absence of said second identification signal,

wherein said identification signal distinguishing portion instructs said

recording standby signal generating portion to input said recording standby signal to said identification signal switching portion when distinguishing absence of said second identification signal.

8. A video signal output device, comprising:

a copy flag detecting portion for detecting a signal indicating copy protect from a digital video signal including said signal indicating copy protect and digital video data;

an identification signal distinguishing portion receiving and distinguishing an identification signal outputted from at least one external device externally connected to said video signal output device and indicating performance of said at least one external device;

a screen display resolution setting portion receiving said digital video data read from said digital video signal and for setting a displayable range of said digital video data in accordance with each of said at least one external device on the basis of a result of distinction made in said identification signal distinguishing portion;

a video data analog converting portion connected to said screen display resolution setting portion for converting said digital video data into an analog video signal;

a signal output enable/disable determining portion for determining whether to output said analog video signal to said at least one external device on the basis of a result of detection in said copy flag detecting portion and a result of distinction in said identification signal distinguishing portion; and

a video output determining portion connected to said video data analog converting portion and at least having a function of determining whether to output

said analog video signal to said at least one external device in accordance with a result of determination in said signal output enable/disable determining portion.

9. The video signal output device according to claim 8, wherein said video output determining portion further comprises a function of determining whether to add said signal indicating copy protect to said analog video signal in accordance with a result of determination in said signal output enable/disable determining portion.

10. The video signal output device according to claim 8, wherein said identification signal distinguishing portion further comprises a function of outputting a signal indicating that said at least one external device is a device capable of recording said analog video signal to said signal output enable/disable determining portion when said identification signal indicating performance is not provided from said at least one external device or when said identification signal cannot be identified.

11. The video signal output device according to claim 8, wherein said at least one external device includes a recording device and another external device,

wherein said screen display resolution setting portion further comprises a function of changing said analog video signal outputted in accordance with performance of said another external device to a displayable range adapted to said recording device when an identification signal indicating performance of said recording device is inputted to said identification signal distinguishing portion.

12. A signal processing method for a video display/record system comprising a video signal output device and at least one external device externally connected to said video signal output device, comprising the steps of:

(a) in said video signal output device, detecting an identification signal outputted from said at least one external device and indicating performance thereof;

(b) checking past record of connection of said at least one external device connected to said video signal output device on the basis of said identification signal;

(c) setting a displayable range of video signal outputted from said video output device in accordance with said at least one external device when said at least one external device is different from a device connected last time;

(d) checking to see whether said at least one external device has a recording function;

(e) when said at least one external device has no recording function, converting said video signal into an analog video signal and outputting the analog video signal from said video output device;

(f) when said at least one external device has a recording function, reading a copy allowing/inhibiting flag indicating whether the video signal is copy–allowed or –inhibited to determine whether the video signal can be copied;

(g) when said video signal is copy–allowed, outputting said analog video signal from said video output device; and

(h) when said video signal is copy–inhibited, determining in which form said analog video signal is to be outputted.

ABSTRACT OF THE DISCLOSURE

In a recording device (1), a switching portion (19) is supplied with an ID signal from an identification signal generating portion (21) in a video display device (2) through a connector output portion (8). The switching portion (19) is also supplied with an ID signal outputted from an identification signal generating portion (15) in the recording device (1). When the ID signal indicating the video display device (2) is outputted from a return identification signal distinguishing portion (17) to a recording standby signal generating portion (18), the switching portion (19) is switched to the side–b so that the ID signal inputted to the recording device (1) is outputted to the outside as it is. The ID signal passed through the recording device (1) is inputted to an identification signal input portion (41) in an analog video signal output processing portion (4). When a recording standby ON signal is inputted from a recording standby switch (16) into the recording standby signal generating portion (18), the switching portion (19) is switched to the side–a independently of presence/absence of the signal input from the return identification signal distinguishing portion (17) so that the ID signal of the recording device (2) is outputted to the outside from the identification signal generating portion (15).

FIG. 1

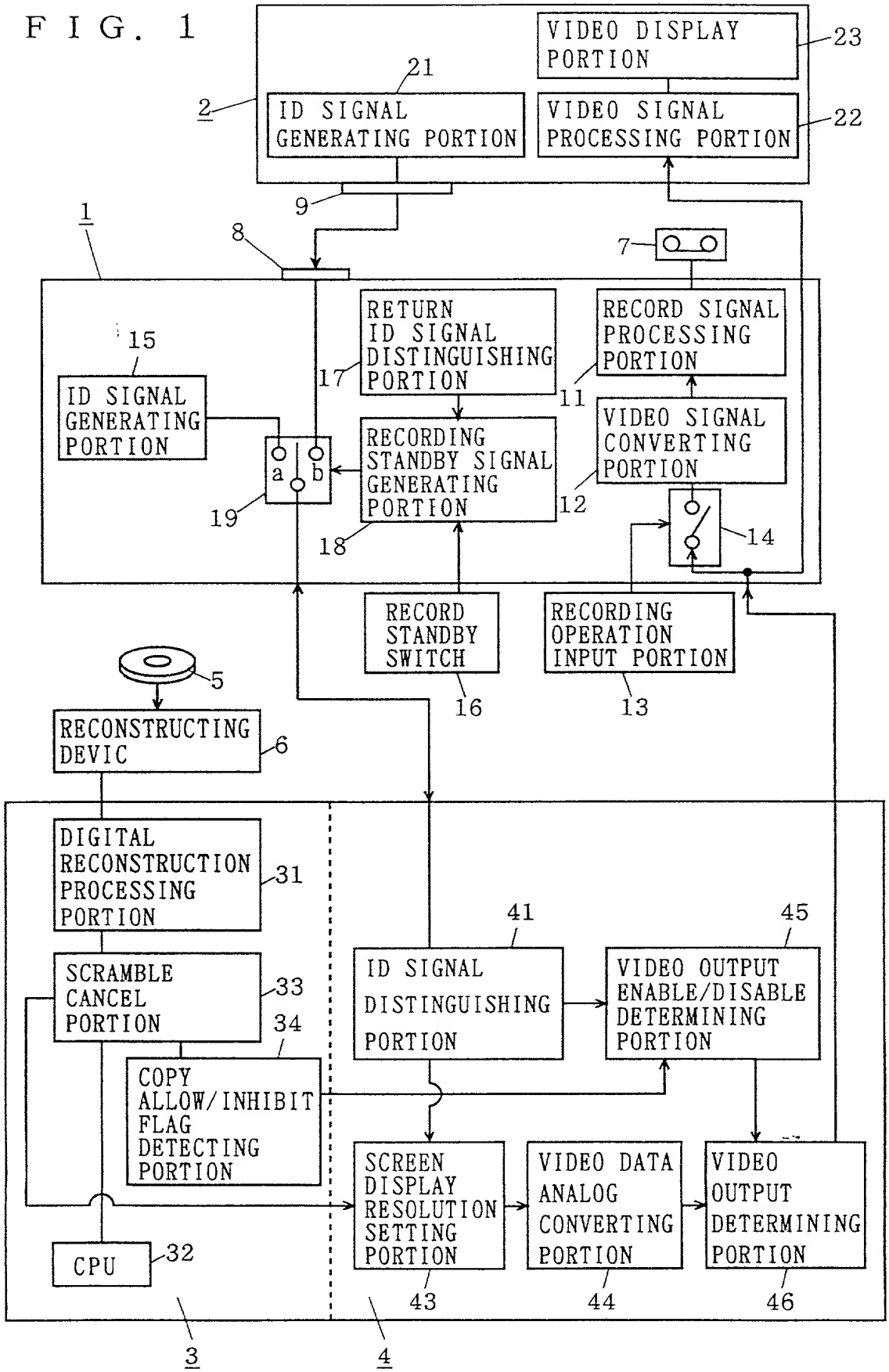

VIDEO DISPLAY PORTION
23
21
2
ID SIGNAL GENERATING PORTION
VIDEO SIGNAL PROCESSING PORTION
22
9
1
8
7
RETURN ID SIGNAL DISTINGUISHING PORTION
RECORD SIGNAL PROCESSING PORTION
15
17
11
ID SIGNAL GENERATING PORTION
VIDEO SIGNAL CONVERTING PORTION
a
b
RECORDING STANDBY SIGNAL GENERATING PORTION
19
12
18
14
RECORD STANDBY SWITCH
RECORDING OPERATION INPUT PORTION
16
13
5
RECONSTRUCTING DEVIC
6
DIGITAL RECONSTRUCTION PROCESSING PORTION
31
41
45
SCRAMBLE CANCEL PORTION
33
ID SIGNAL DISTINGUISHING PORTION
VIDEO OUTPUT ENABLE/DISABLE DETERMINING PORTION
34
COPY ALLOW/INHIBIT FLAG DETECTING PORTION
SCREEN DISPLAY RESOLUTION SETTING PORTION
VIDEO DATA ANALOG CONVERTING PORTION
VIDEO OUTPUT DETERMINING PORTION
CPU
32
43
44
46
3
4

FIG. 2A

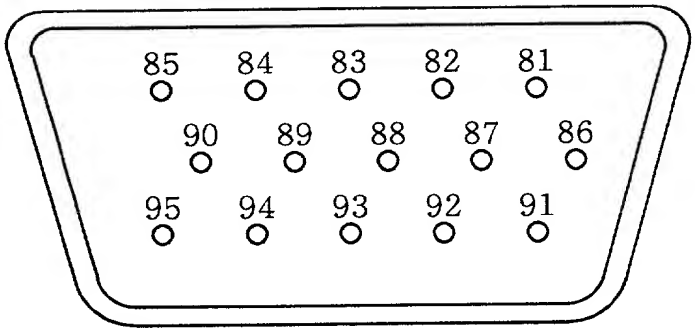


FIG. 2B

PIN No.	DISPLAY ADAPTER CONNECTOR
81	VIDEO RED
82	VIDEO GREEN
83	VIDEO BLUE
84	MONITOR ID BIT 2
85	DDC RETURN (FOR PINS 89,92,95)
86	VIDEO RED RETURN
87	VIDEO GREEN RETURN
88	VIDEO BLUE RETURN
89	+5V SUPPLY (OPTION)
90	SYNC RETURN
91	MONITOR ID BIT 0
92	DATA FROM DISPLAY
93	HORIZONTAL SYNC
94	VCLK (VERTICAL SYNC)
95	MONITOR ID BIT 3

FIG. 3

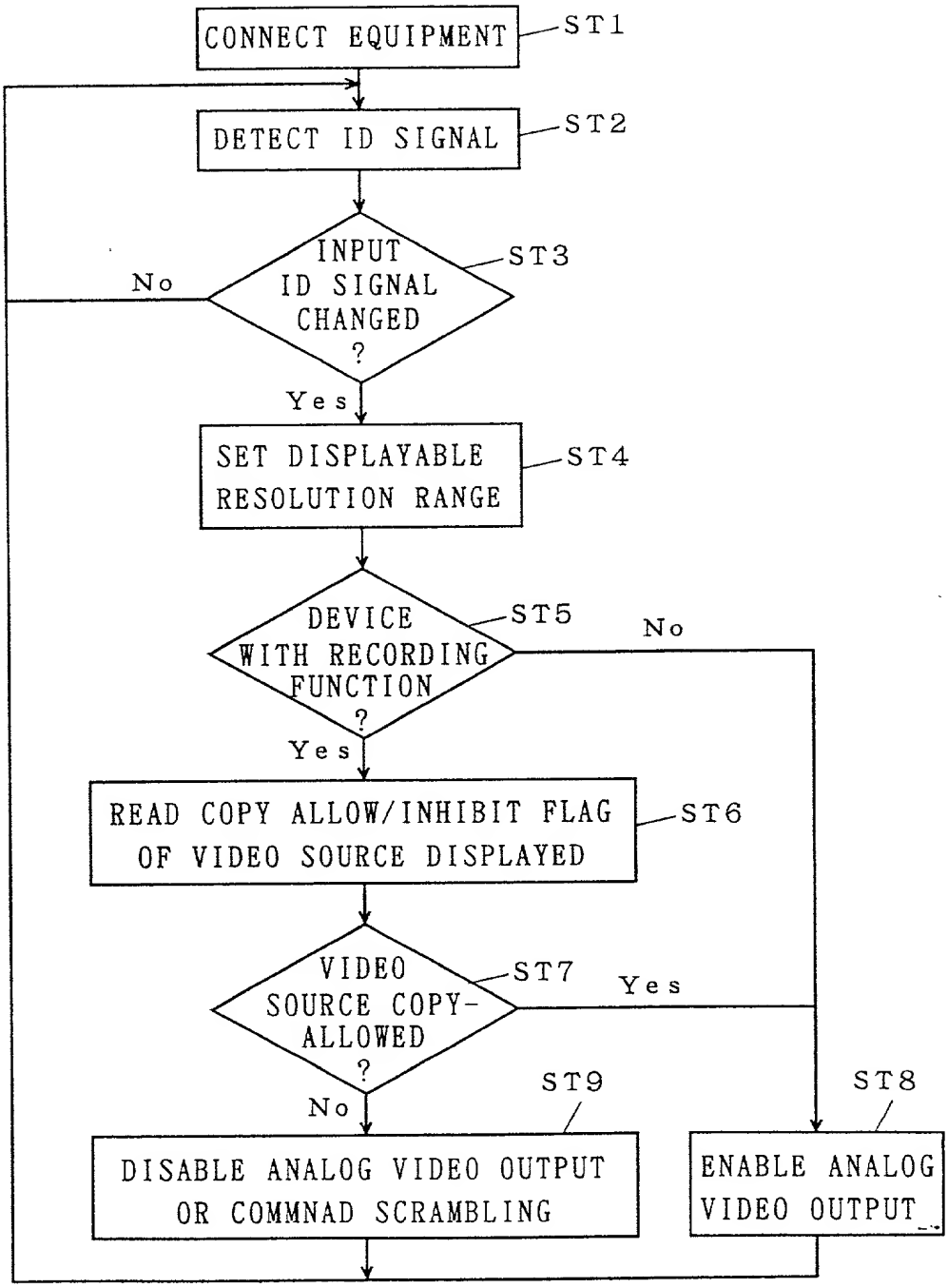

CONNECT EQUIPMENT
ST1
DETECT ID SIGNAL
ST2
INPUT ID SIGNAL CHANGED ?
ST3
No
Yes
SET DISPLAYABLE RESOLUTION RANGE
ST4
DEVICE WITH RECORDING FUNCTION ?
ST5
No
Yes
READ COPY ALLOW/INHIBIT FLAG OF VIDEO SOURCE DISPLAYED
ST6
VIDEO SOURCE COPY-ALLOWED ?
ST7
Yes
No
ST9
ST8
DISABLE ANALOG VIDEO OUTPUT OR COMMNAD SCRAMBLING
ENABLE ANALOG VIDEO OUTPUT

FIG. 4

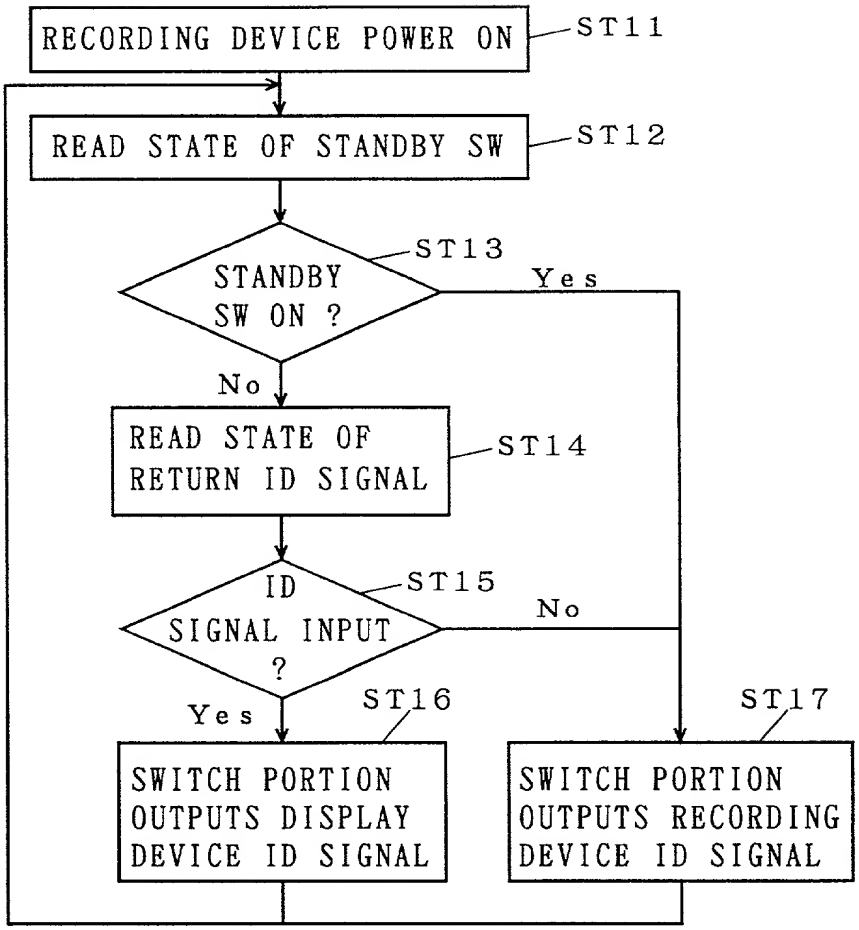
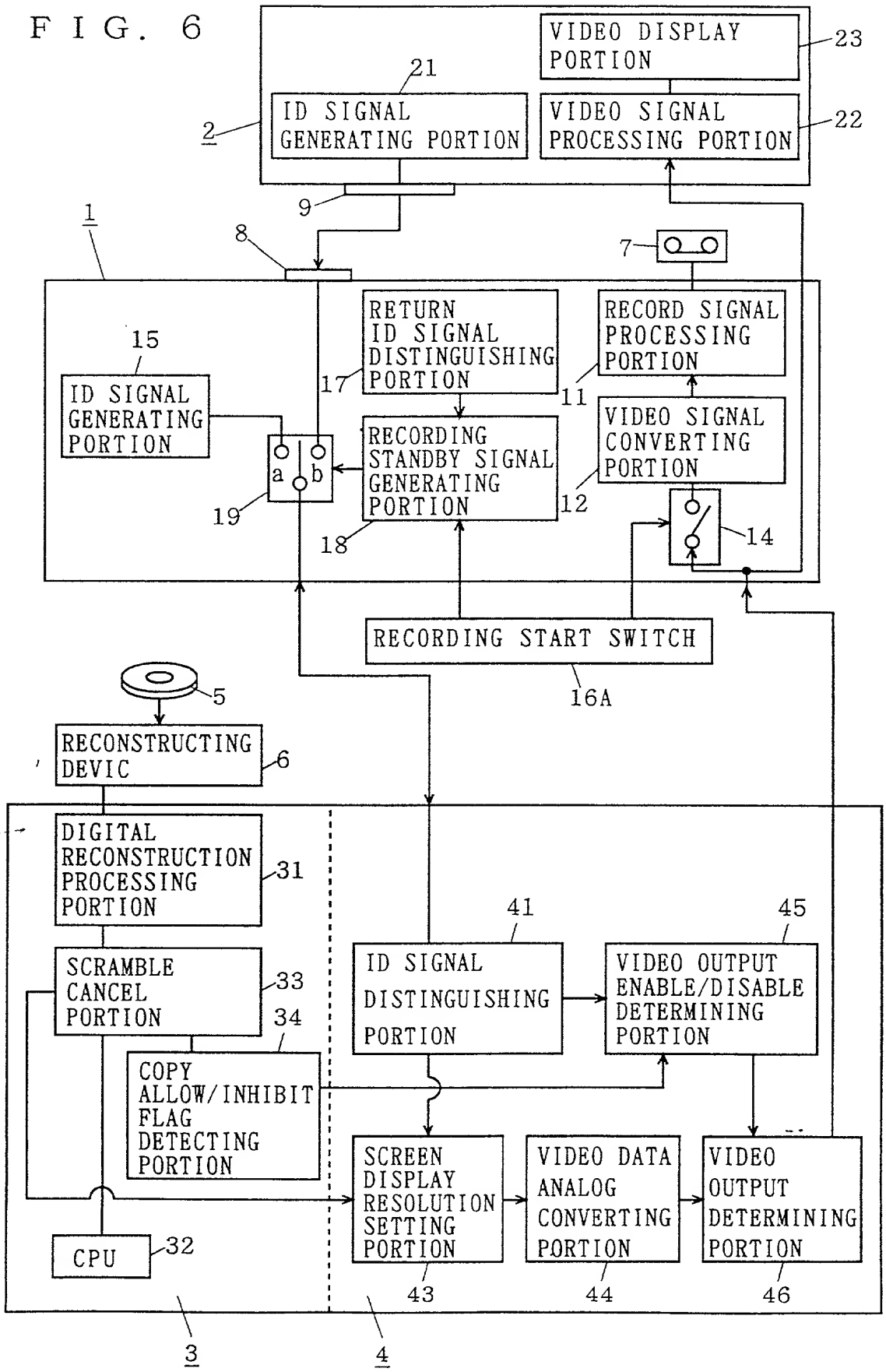

RECORDING DEVICE POWER ON
ST11
READ STATE OF STANDBY SW
ST12
STANDBY SW ON ?
ST13
Yes
No
READ STATE OF RETURN ID SIGNAL
ST14
ID SIGNAL INPUT ?
ST15
No
Yes
ST16
ST17
SWITCH PORTION OUTPUTS DISPLAY DEVICE ID SIGNAL
SWITCH PORTION OUTPUTS RECORDING DEVICE ID SIGNAL

FIG. 5

SETABLE TIMING				MONITOR A	MONITOR B	MONITOR C	MONITOR D
RESOLUTION	NUMBER OF DISPLAY COLORS	HORIZONTAL SCAN FREQUENCY (kHz)	VERTICAL SCAN FREQUENCY (Hz)				
640×480	16.7M,65K,256	31.5	60	○	○	○	○
640×480	16.7M,65K,256	37.9	72	○	○	○	○
640×480	16.7M,65K,256	39.4	75	○	○	○	○
640×480	16.7M,65K,256	52.4	100	○	×	○	○
800×600	16.7M,65K,256	35.2	56	○	○	○	○
800×600	16.7M,65K,256	37.9	60	○	○	○	○
800×600	16.7M,65K,256	46.9	75	○	○	○	○
800×600	16.7M,65K,256	62.7	100	○	○	○	○
1024×768	65K,256	35.4	87	○	○	○	○
1024×768	65K,256	48.4	60	○	○	○	○
1024×768	65K,256	56.5	70	○	○	○	○
1024×768	65K,256	60.0	75	○	○	○	○
1024×768	65K,256	80.6	100	○	○	×	○
1152×864	256	56.7	60	○	○	○	○
1152×864	256	66.9	70	○	○	○	○
1152×864	256	76.6	80	○	○	×	○
1280×1024	256	50.3	94	○	○	○	○
1280×1024	256	63.9	60	○	○	○	○
1280×1024	256	73.9	70	○	○	×	×
1280×1024	256	79.0	75	○	○	×	×
1600×1200	256	62.4	98	○	×	○	○
1600×1200	256	76.6	60	○	×	×	○
1600×1200	256	79.6	62	○	×	×	○

○…DISPLAYABLE

FIG. 6


VIDEO DISPLAY PORTION
23
21
ID SIGNAL GENERATING PORTION
2
VIDEO SIGNAL PROCESSING PORTION
22
9
1
8
7
RETURN ID SIGNAL DISTINGUISHING PORTION
RECORD SIGNAL PROCESSING PORTION
15
17
11
ID SIGNAL GENERATING PORTION
VIDEO SIGNAL CONVERTING PORTION
a
b
RECORDING STANDBY SIGNAL GENERATING PORTION
19
12
18
14
RECORDING START SWITCH
16A
5
RECONSTRUCTING DEVIC
6
DIGITAL RECONSTRUCTION PROCESSING PORTION
31
41
45
SCRAMBLE CANCEL PORTION
33
ID SIGNAL DISTINGUISHING PORTION
VIDEO OUTPUT ENABLE/DISABLE DETERMINING PORTION
34
COPY ALLOW/INHIBIT FLAG DETECTING PORTION
SCREEN DISPLAY RESOLUTION SETTING PORTION
VIDEO DATA ANALOG CONVERTING PORTION
VIDEO OUTPUT DETERMINING PORTION
CPU
32
43
44
46
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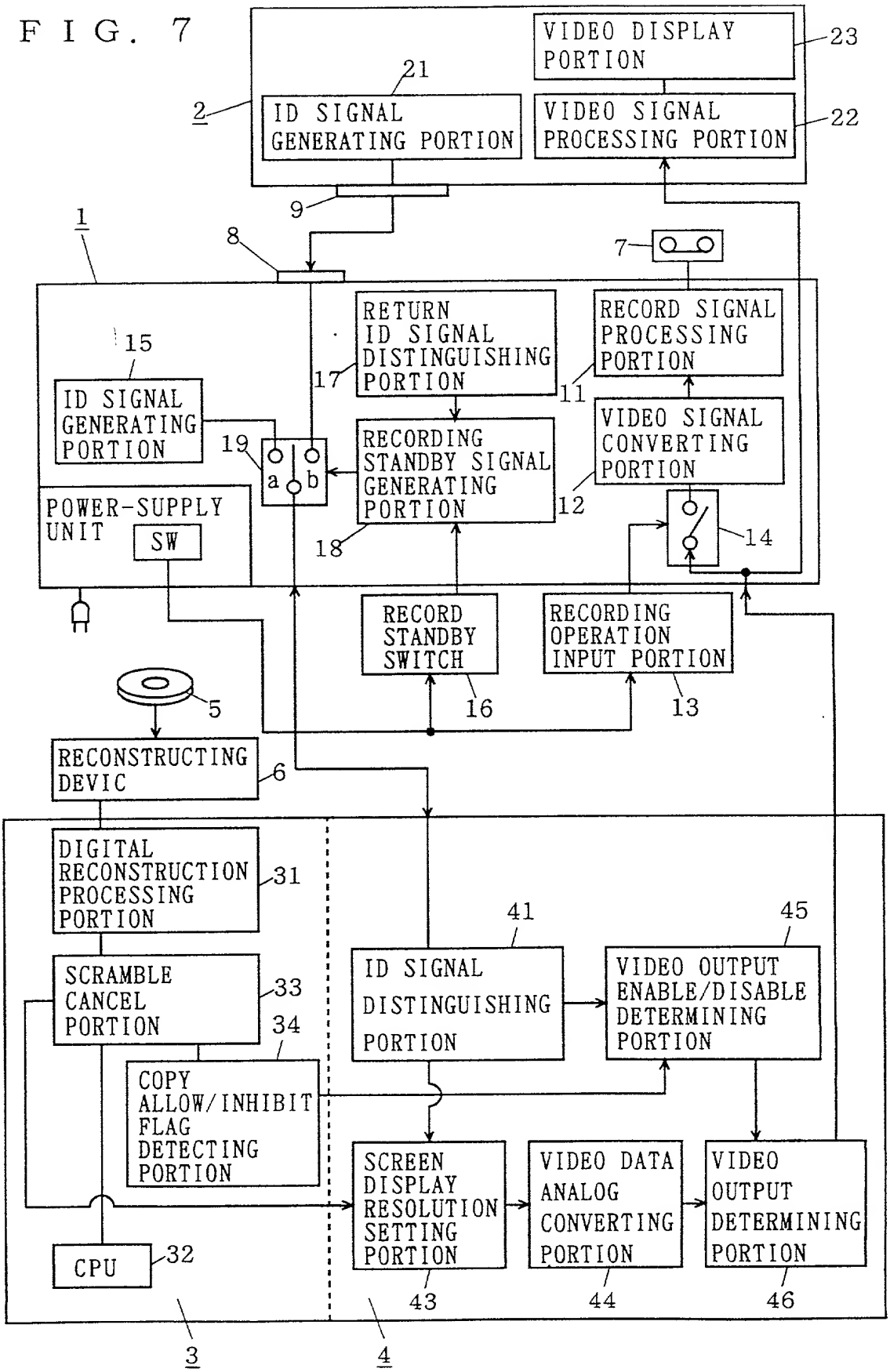
4

FIG. 7


VIDEO DISPLAY PORTION
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ID SIGNAL GENERATING PORTION
VIDEO SIGNAL PROCESSING PORTION
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7
RETURN ID SIGNAL DISTINGUISHING PORTION
RECORD SIGNAL PROCESSING PORTION
15
17
11
ID SIGNAL GENERATING PORTION
VIDEO SIGNAL CONVERTING PORTION
19
a
b
RECORDING STANDBY SIGNAL GENERATING PORTION
12
POWER-SUPPLY UNIT
SW
18
14
RECORD STANDBY SWITCH
RECORDING OPERATION INPUT PORTION
16
13
5
RECONSTRUCTING DEVIC
6
DIGITAL RECONSTRUCTION PROCESSING PORTION
31
41
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SCRAMBLE CANCEL PORTION
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VIDEO DATA ANALOG CONVERTING PORTION
VIDEO OUTPUT DETERMINING PORTION
CPU
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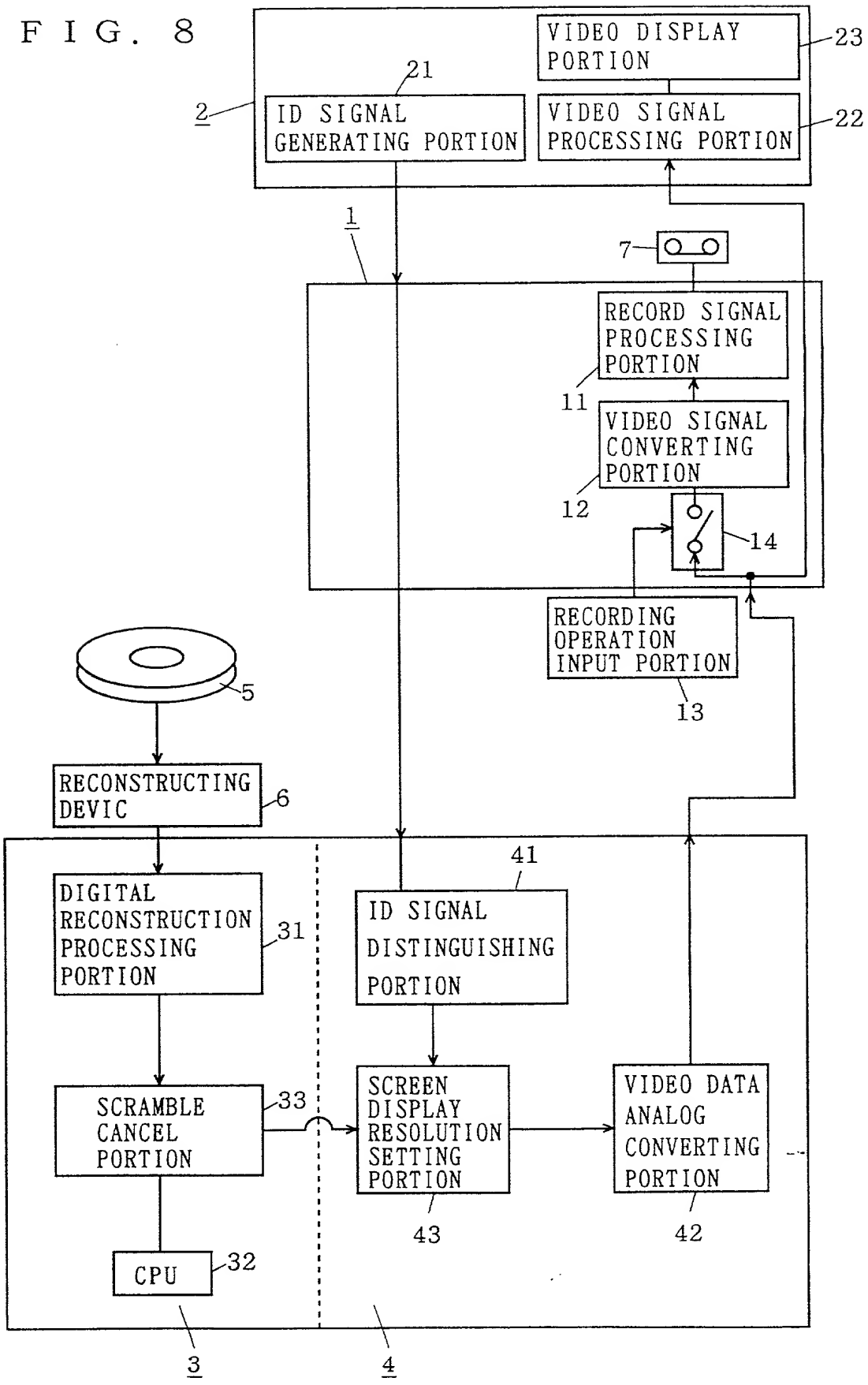
FIG. 8


VIDEO DISPLAY PORTION
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VIDEO SIGNAL PROCESSING PORTION
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RECORD SIGNAL PROCESSING PORTION
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VIDEO SIGNAL CONVERTING PORTION
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RECORDING OPERATION INPUT PORTION
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DIGITAL RECONSTRUCTION PROCESSING PORTION
31
ID SIGNAL DISTINGUISHING PORTION
SCRAMBLE CANCEL PORTION
33
SCREEN DISPLAY RESOLUTION SETTING PORTION
43
VIDEO DATA ANALOG CONVERTING PORTION
42
CPU
32
3
4

Declaration and Power of Attorney For Patent Application

特許出願宣言書及び委任状

Japanese Language Declaration

日本語宣言書

下記の氏名の発明者として、私は以下の通り宣言します。

As a below named inventor, I hereby declare that:

私の住所、私書箱、国籍は下記の私の氏名の後に記載された通りです。

My residence, post office address and citizenship are as stated next to my name.

下記の名称の発明に関して請求範囲に記載され、特許出願している発明内容について、私が最初かつ唯一の発明者（下記の氏名が一つの場合）もしくは最初かつ共同発明者であると（下記の名称が複数の場合）信じています。

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

RECORDING DEVICE, VIDEO OUTPUT DEVICE, VIDEO DISPLAY/RECORD SYSTEM AND SIGNAL PROCESSING METHOD FOR VIDEO DISPLAY /RECORD SYSTEM

上記発明の明細書（下記の欄でx印がついていない場合は、本書に添付）は、

the specification of which is attached hereto unless the following box is checked:

☐ __月__日に提出され、米国出願番号または特許協定条約国際出願番号を_____とし、
（該当する場合）_____ に訂正されました。

☐ was filed on _____
as United States Application Number or
PCT International Application Number
_____ and was amended on
_____ (if applicable).

私は、特許請求範囲を含む上記訂正後の明細書を検討し、内容を理解していることをここに表明します。

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

私は、連邦規則法典第３７編第１条５６項に定義されるとおり、特許資格の有無について重要な情報を開示する義務があることを認めます。

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

Japanese Language Declaration
(日本語宣言書)

2257-116P

私は、米国法典第３５編１１９条(a)-(d)項又は３６５条(b)項に基き下記の、米国以外の国の少なくとも一ヵ国を指定している特許協力条約３６５(a)項に基ずく国際出願、又は外国での特許出願もしくは発明者証の出願についての外国優先権をここに主張するとともに、優先権を主張している、本出願の前に出願された特許または発明者証の外国出願を以下に、枠内をマークすることで、示しています。

I hereby claim foreign priority under Title 35, United States Code, Section 119 (a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)
外国での先行出願

(Number) (番号)	(Country) (国名)	(Day/Month/Year Filed) (出願年月日)	Priority Not Claimed 優先権主張なし
P08-326682	Japan	06/12/1996	☐
			☐

私は、第３５編米国法典１１９条(e)項に基いて下記の米国特許出願規定に記載された権利をここに主張いたします。

I hereby claim the benefit under Title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below.

(Application No.) (出願番号)	(Filing Date) (出願日)

私は、下記の米国法典第３５編１２０条に基いて下記の米国特許出願に記載された権利、又は米国を指定している特許協力条約３６５条(c)に基ずく権利をここに主張します。また、本出願の各請求範囲の内容が米国法典第３５編１１２条第１項又は特許協力条約で規定された方法で先行する米国特許出願に開示されていない限り、その先行米国出願書提出日以降で本出願書の日本国内または特許協力条約国際提出日までの期間中に入手された、連邦規則法典第３７編１条５６項で定義された特許資格の有無に関する重要な情報について開示義務があることを認識しています。

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s), or 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code Section 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of application.

(Application No.) (出願番号)	(Filing Date) (出願日)	(Status. Patented, Pending, Abandoned) (現況：特許許可済、係属中、放棄済)

私は、私自身の知識に基ずいて本宣言書中で私が行なう表明が真実であり、かつ私の入手した情報と私の信じるところに基ずく表明が全て真実であると信じていること、さらに故意になされた虚偽の表明及びそれと同等の行為は米国法典第１８編第１００１条に基ずき、罰金または拘禁、もしくはその両方により処罰されること、そしてそのような故意による虚偽の声明を行なえば、出願した、又は既に許可された特許の有効性が失われることを認識し、よってここに上記のごとく宣誓を致します。

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Japanese Language Declaration
(日本語宣言書)

委任状：私は下記の発明者として、本出願に関する一切の手続きを米特許商標局に対して遂行する弁理士または代理人として、下記の者を指名いたします。
（弁護士、または代理人の氏名及び登録番号を明記のこと）

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith (*list name and registration number*)

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JOSEPH A. KOLASCH (Reg. No. 22,463)
JAMES M. SLATTERY (Reg. No. 28,380)
DONALD C. KOLASCH (Reg. No. 23, 038)
CHARLES GORENSTEIN (Reg. No. 29,271)
LEONARD C. SVENSSON (Reg. No. 30,330)
MARC S. WEINER (Reg. No. 32,181)
ANDREW F. REISH (Reg. No. 33,443)
TERRELL C. BIRCH (Reg. No. 19,382)
ANTHONY L. BIRCH (Reg. No. 26,122)
BERNARD L. SWEENEY (Reg. No. 24,448)
MICHAEL K. MUTTER (Reg. No. 29,680)
GERALD M. MURPHY, JR. (Reg. No. 28,977)
TERRY L. CLARK (Reg. No. 32,644)
ANDREW D. MEIKLE (Reg. No. 32,868)
JOE M. MUNCY (Reg. No. 32,334)

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Direct Telephone Calls to: (*name and telephone number*)

(703) 205-8000

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発明者の署名 日付	Inventor's signature: Naoki Kato Date: November 18, 1997
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国籍	Citizenship: JAPAN
私書箱	Post Office Address: c/o Mitsubishi Denki Kabushiki Kaisha, 2-3, Marunouchi 2-chome, Chiyoda-ku, TOKYO 100 JAPAN
第二共同発明者	Full name of second joint inventor, if any
第二共同発明者の署名 日付	Second inventor's signature Date
住所	Residence
国籍	Citizenship
私書箱	Post Office Address

（第三以降の共同発明者についても同様に記載し、署名をすること）

(Supply similar information and signature for third and subsequent joint inventors)